1998. The Journal of Arachnology 26:9–13

A NEW FOSSIL HARVESTMAN FROM DOMINICAN REPUBLIC AMBER (OPILIONES, SAMOIDAE, *HUMMELINCKIOLUS*)

James C. Cokendolpher: 2007 29th Street, Lubbock, Texas 79411 USA

George O. Poinar, Jr.: Entomology Department, Oregon State University, Cordley Hall 2046, Corvallis, Oregon 97331 USA

ABSTRACT. ***Hummelinckiolus silhavyi*** new species is described from both the male and female from Dominican Republic amber (Upper Eocene in age). This is the first record of the genus from Hispaniola and the Greater Antilles. An emended diagnosis of *Hummelinckiolus* is provided. A modern *Hummelinckiolus* sp. is reported from St. John, U.S. Virgin Islands.

The traditional view of the world-wide family Phalangodidae and its subfamilies by Roewer (1923) was based entirely on characters of external morphology. More recent studies of the genitalia are revealing many of the subfamilies are polyphyletic and that most of these subfamilies should be raised to full family status. The Phalangodinae as viewed by Roewer (1923) is such a polyphyletic group. Martens (1986) and Staręga (1989) noted that the members of the Phalangodinae (Phalangodidae *sensu stricto*) are apparently restricted to the Holarctic region and that previously included taxa from other regions need revision and regrouping in other families. This revision has been completed (at least in part) but has not been published (Kury 1993). Kury (pers. comm. 1996) has examined specimens from Madagascar and illustrations of others from Australia which he deems to belong to the Phalangodidae *sensu stricto*, but otherwise the Phalangodidae appear to be limited to the Holarctic region. None of the Caribbean taxa formerly placed in the Phalangodidae remain there in Kury's revision. Some of the Caribbean "phalangodids" had previously been moved to the Samoinae by Šilhavý (1979). Staręga (1992) raised the subfamily Samoinae (Phalangodidae) to full family status; an action that is accepted by Kury (pers. comm. 1996). There are currently 22 genera placed in the Samoidae, and Kury (pers. comm. 1996) accepts an additional five genera. Of these, 12 occur in the West Indies, Central America, and Venezuela. The remaining genera are found in Africa and scattered localities in the Indian and Pacific oceans and do not have member species occurring in the Americas.

"Phalangodid" harvestmen are poorly known from Hispaniola. The present discovery of a new species brings the total for the island to eight, half of which are known only by fossils (Cokendolpher & Camilo-Rivera 1989; Cokendolpher & Poinar 1992). As noted by us earlier (1992), this apparent scarcity of species may not be a true reflection of the fauna. More likely, the low number of species is an indication of the few collections made. Although there are four fossil species of "phalangodid" recorded from the Dominican Republic, only a single modern species has been reported (Cokendolpher 1987). The "phalangodid" fauna of the Dominican Republic now consist of ***Hummelinckiolus silhavyi*** new species (Samoidae) †, *Kimula* sp. (Minuidae, according to Kury pers. comm. 1996) †, *Pellobunus haitiensis* Šilhavý 1979 (Samoidae), *Pellobunus proavus* Cokendolpher 1987 (Samoidae) †, and *Philacarus hispaniolensis* Cokendolpher & Poinar 1992 (Samoidae?) †.

MATERIALS

The amber pieces containing the fossils are believed to have originated from mines in the northern mountain ranges in the Dominican Republic. These mines are in the El Mamey Formation (Upper Eocene), which is shale-sandstone interspersed with a conglomerate of well-rounded pebbles (Eberle et al. 1980). The exact age of the amber is unknown. It was formed from resins produced by an extinct al-

garroba tree (*Hymenaea protera* Poinar 1991: Leguminosae). Clumps of resin fell from the trees to the ground, were buried, then washed by torrential rains, and deposited in low-lying areas. These areas were then flooded by sea water; and, later, the amber was deposited along with other sediments on the sea floor. Mountain formation resulted in the amber and other marine deposits being uplifted to the surface where it is now exposed in the mines. Estimates based on microfossils in the deposits of the Dominican Republic and chemical analyses of the ambers from various mines on the island provide a range from 15–20 million years (Iturralde-Vincent & MacPhee 1996) to 30–45 million years (Cepek in Schlee 1990).

SYSTEMATICS

Order Opiliones

Suborder Laniatores

Family Samoidae Sørensen 1886

Hummelinckiolus Šilhavý

Hummelinckiolus Šilhavý 1979:8.

Type species.—*Hummelinckiolus parvus* Šilhavý 1979, by monotypy.

Diagnosis (emended).—Ocular tubercle cone-shaped, slightly to strongly directed anteriorly, unarmed, placed on anterior edge of cephalothorax; anterolateral margin of cephalothorax with 1–2 small tubercles over each trochanter I; chelicerae not sexually dimorphic, without stridulatory organ; pedipalps without teeth, femur with distomesal spine, tibia with two pairs of ventrolateral spines; leg tarsal segments 3:(3/4):(4/5):(4/5), with scopulae on III and IV; femur IV not enlarged or armed in males; distitarsus I and II each with two segments; metatarsus III enlarged and spindleform in male; areae, free tergites and free sternites unarmed, first area without median line; spiracles not visible.

Identification.—The combination of the above mentioned diagnostic characters will separate *Hummelinckiolus* from all other known "phalangodids." The presence of three tarsal I segments will separate *Hummelinckiolus* from all New World genera currently placed in the Samoidae. Kury (pers. comm. 1996) also placed three Central and South American genera with three tarsal I segments into the Samoidae: *Cornigera* González-Sponga 1987, *Microminua* Sørensen 1932, and *Neocynortina* Goodnight & Goodnight 1983. *Hummelinckiolus* and members of these genera also have similar penes: truncus not greatly widened and truncated distally, with two longitudinal rows of 3–4 dorsal spines (González-Sponga 1987, figs. 62–63; Sørensen 1932, fig. 8; Goodnight & Goodnight 1983, fig. 68; Šilhavý 1979, figs. 16–17). The members of the three Central and South American genera are not sexual dimorphic, whereas *Hummelinckiolus* differs by having the male metatarsus III enlarged and spindleform. Spindleform metatarsus III also are known from six other samoid genera and the related family Biantidae. *Hummelinckiolus* is the only New World Samoidae with 2–2 distitarsal segments; all other New World genera (including the three genera recognized by Kury) have 2–3 segments. Most, but not all, Old World samoid genera also have 2–3 segments.

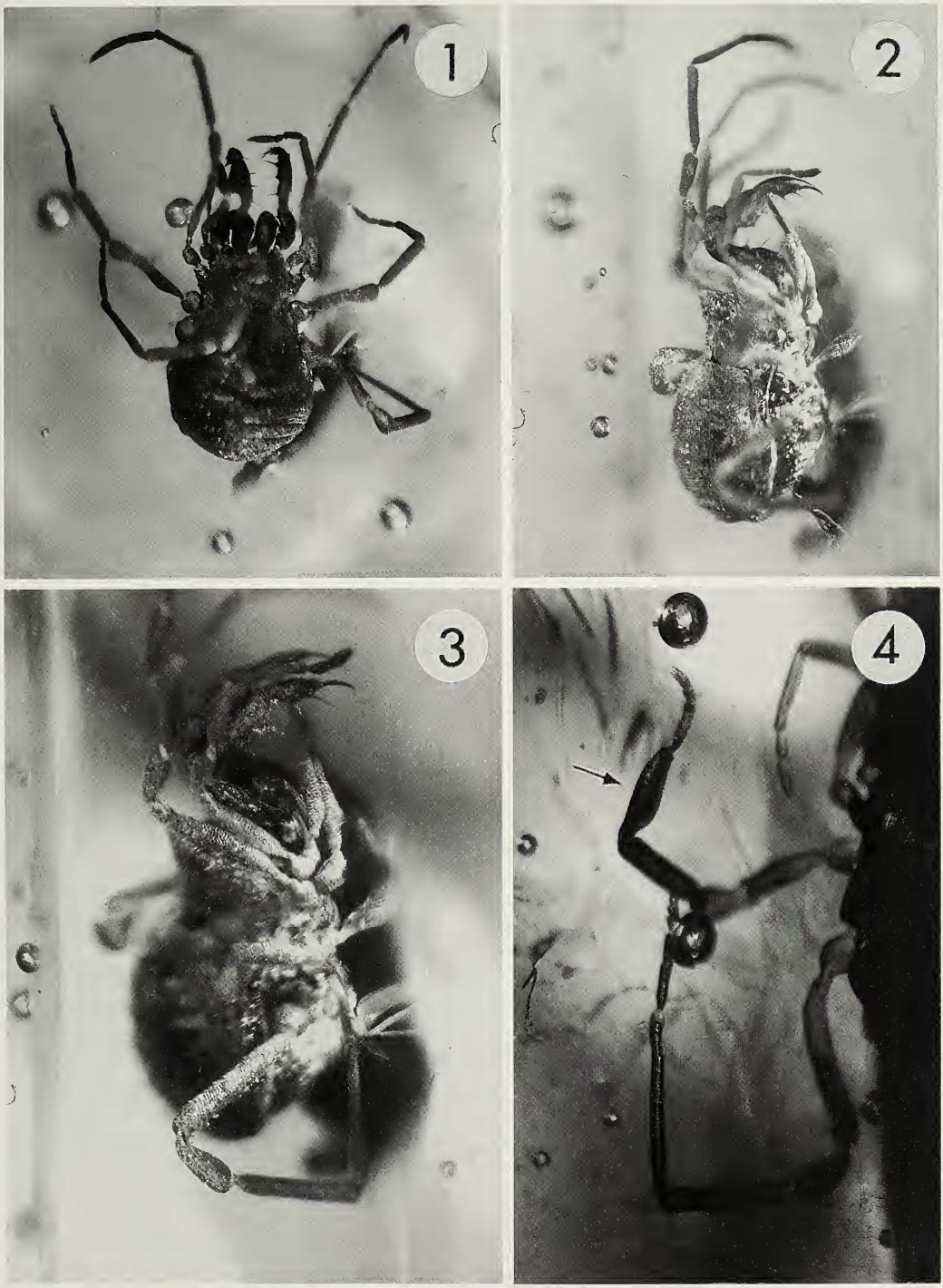
Comments.—With the description of *Hummelinckiolus silhavyi* new species, the genus now contains two named species. *Hummelinckiolus parvus* Šilhavý 1979 is known for several of the smaller Windward Islands in the Lesser Antilles. *Hummelinckiolus silhavyi* new species is known only from Dominican Republic amber.

The "Samoinae gen. et sp." reported by Muchmore (1993) from St. John, U.S. Virgin Islands we also place in *Hummelinckiolus*. This species differs from the two described species by the greater number of tarsal II segments (4, instead of 3) and by having the ocular tubercle more pointed (but still rounded). These are probably insignificant differences at the generic level and therefore we have emended the generic diagnosis above to include these characters. The penis of the St. John species is very similar to that illustrated by Šilhavý (1979; figs. 16, 17) for *H. parvus*; differing mainly by having longer spines. Further description of this modern taxa is beyond the scope of this paper.

Hummelinckiolus silhavyi new species
Figs. 1–4

Type data.—The female holotype (# A-10-75A) and male paratype (# A-10-75B) are deposited in the Poinar Amber Collection maintained at the Entomology Department, Oregon State University, Corvallis, Oregon.

Etymology.—This species is named in



Figures 1–4.—***Hummelinckiolus silhavyi*** new species. 1, Dorsal view of body, female; 2, Lateral view of body, showing ocular tubercle, female; 3, Lateral view of leg femora showing fine granulation, female; 4, Legs 3, 4, and part of leg 2, note enlarged metatarsus 3, male.

Table 1.—Appendage lengths (in mm) in ***Hummelinckiolus silhavyi*** new species (? = structure obviously distorted or hidden from view).

	Leg I	Leg II	Leg III	Leg IV	Palpus
Female					
Trochanter	0.13	0.12	0.12	0.16	0.12
Femur	0.50	0.58	0.52	0.70	0.40
Patella	0.16	0.28	0.20	0.30	0.22
Tibia	0.27	0.50	0.38	0.48	0.25
Metatarsus	0.29	0.80	0.46	0.69	—
Tarsus/Claw	0.34	0.55	0.34	0.47	0.45
Totals	1.69	2.83	2.16	2.74	1.44
Male					
Trochanter	0.13	0.14	0.13	0.18	0.18
Femur	?	?	0.51	0.72	?
Patella	0.23	?	0.25	0.30	0.24
Tibia	0.32	0.63	0.46	0.53	0.28
Metatarsus	0.43	0.52	0.50	0.80	—
Tarsus/Claw	0.28	0.65	0.34	0.51	0.46
Totals	1.26+	1.94+	2.19	3.04	1.16+

honor of Vladimir Šilhavý (1913–1984) for his detailed studies of West Indian opilions.

Differential diagnosis.—*Hummelinckiolus silhavyi* new species is easily distinguished from *H. parvus* on the basis of the number of tarsal segments: 3:3:5:5 in *H. silhavyi* and 3:3:4:4 in *H. parvus*. The legs of *H. silhavyi* are finely granulated, whereas those of *H. parvus* are smooth. The new species is also smaller in overall size, but the significance of this is unknown because of the small sample size.

Description.—*Female:* Body small, total length 1.38 mm, greatest width (posterior end of abdomen) 0.94 mm; cephalothorax length 0.36 mm; ocular tubercle cone-shaped, slightly anteriorly directed, unarmed, 0.10 mm tall, 0.23 mm wide at base; placed at anterior edge of cephalothorax; eyes on base of ocular tubercle; cheliceral segment lengths 0.25 mm (basal piece), 0.54 mm (distal piece, 0.26 fixed jaw); distal ⅔ of basal segment somewhat enlarged and raised dorsally; stridulatory organs absent. Dorsum of body and leg coxae covered with relatively large granules; ventrally with only a few scattered fine granules and a row of small granules on each free sternite. Genital operculum 0.16 wide, 0.16 long; with only fine granules and few setae. Anterior margin of cephalothorax with two (left) and one (right) small tubercles at base of each leg I. Openings to scent glands and spiracles undetected. Appendage lengths in Table 1. Pedipalps with long spines: two on basomesal and one on distomesal areas of femur; patella with single spine ventromesally; tibia and tarsus each with mesal and lateral pair ventrally; tarsal claw long, smooth. Legs densely covered with fine granules, unarmed; femora IV curved to follow outline of abdomen. Tarsal segments 3:3:5:5; scopulae undetected (see comments below); tarsus IV uniform, 0.04 mm wide; distitarsus I and II each with two segments.

Male: Generally as for female, except body smaller and appendages longer. Appendage lengths in Table 1. Tarsus IV enlarged (0.11 mm wide in middle) and spindleform. Male not as well preserved and amber has cracks and air bubbles which obstruct some views. Total length 1.19 mm, greatest width 0.88 mm; ocular tubercle 0.21 wide, height obscured; chelicerae not greatly enlarged or otherwise modified. Anterior margin of cephalothorax with two (left, right view obscured) tubercles at base of leg I.

Comments.—It is remarkable that of two specimens known, each sex is represented. Modern "phalangodids" are often found together in pairs under rocks or logs. Because the amber containing the two fossils are different colors, we assume the animals were not together when entrapped in the algarroba tree resin.

Šilhavý (1979) diagnosed the Samoinae

(now regarded as the Samoidae) based in part on the belief that all species had scopulae on tarsi III and IV. No tarsal scopulae were mentioned in the original descriptions of *Cornigera*, *Microminua*, and *Neocynortina*, which Kury places in this family. Members of these genera, like *Hummelinckiolus*, are small animals (body length about 1–1.5 mm) and tarsal scopulae could have been overlooked. Kury (pers. comm. 1996) also places the "*Crosbyella*" spp. described by González-Sponga (1987) from Venezuela in the Samoidae and according to the original descriptions they do not have tarsal scopulae. The tarsal scopulae are difficult (at best) to see on the fossils reported herein. Cokendolpher (1987) remarked that the scopulae on the fossil *Pellobunus proavus* was not as dense as the other congener on that island. Goodnight & Goodnight (1983) noted that the scopulae on Central American *Pellobunus* spp. were not conspicuous and easily overlooked. It appears that the scopulae are not as dense or absent in some samoid genera. It is possible that the microtrichia of the scopulae have an optical density near that of amber, making them to appear to be reduced or absent. The scopulae on the *Hummelinckiolus* from St. John Island are visible; as are those on the type species of the genus. In the original description (Cokendolpher & Poinar 1992), *Philacarus hispaniolensis* was reported to lack scopulae. We have reexamined the fossil and confirmed its absence. In the original description of the only other species in the genus (a modern species from Colombia), Sørensen (1932) did not mention scopulae but placed the genus near *Pellobunus* Banks 1905 and *Metapellobunus* Roewer 1923 (both of which have scopulae). A special effort should me made to reveal the status of scopulae on any new material of *Philacarus*. Scopulae should also be sought on modern members of *Cornigera*, *Microminua*, *Neocynortina*, and "*Crosbyella*."

ACKNOWLEDGMENTS

Dr. William B. Muchmore (University of Rochester) kindly provided specimens of the new species of *Hummelinckiolus* from St. John. Dr. Adriano Kury (Museu Nacional - Universidade Federal do Rio de Janeiro) is thanked for sending us a copy of his dissertation and for comments on the manuscript. Their help is greatly appreciated.

LITERATURE CITED

Cokendolpher, J.C. 1987. A new species of fossil *Pellobunus* from Dominican Republic amber (Arachnida: Opiliones: Phalangodidae). Caribbean J. Sci. (1986), 22:205–211.

Cokendolpher, J.C. & G.R. Camilo-Rivera. 1989. Annotated bibliography to the harvestmen of the West Indies (Arachnida: Opiliones). Occas. Pap. Florida State Coll. Arthropods, 5:1–20.

Cokendolpher, J.C. & G.O. Poinar, Jr. 1992. Tertiary harvestmen from Dominican Republic amber (Arachnida: Opiliones: Phalangodidae). Bull. British Arachnol. Soc., 9:53–56.

Eberle, W., W. Hirdes, R. Muff & M. Pelaez. 1980. The geology of the Cordillera Septentrional. Pp. 619–632, *In* Proc. 9th Caribbean Geol. Conf., August 1980, Santo Domingo.

González-Sponga, M.A. 1987. Aracnidos de Venezuela. Opiliones Laniatores I. Familias Phalangodidae y Agoristenidae. Biblio. Acad. Cien. Físic. Matemát. Nat., Caracas, 23:1–562.

Goodnight, C.L. & M.L. Goodnight. 1983. Opiliones of the family Phalangodidae found in Costa Rica. J. Arachnol., 11:201–242.

Iturralde-Vincent, M.A. & R.D.E. MacPhee. 1996. Age and paleogeographical origin of Dominican amber. Science, 273:1850–1852.

Kury, A.B. 1993. Análise filogenética de Gonyleptoidea (Arachnida, Opiliones, Laniatores). Dissertação de Doutorado, Instituto de Biociências da Universidade de São Paulo, Brasil. viii + 74 pp.

Martens, J. 1986. Die Grossgliederung der Opiliones und die Evolution der Ordnung (Arachnida). Actas X Congr. Int. Aracnol. Jaca, España, I:289–310.

Muchmore, W.B. 1993. List of terrestrial invertebrates of St. John, U.S. Virgin Islands (exclusive of Acarina and Insecta), with some records of freshwater species. Caribbean J. Sci., 29:30–38.

Schlee, D. 1990. Das Bernstein-Kabinett. Stuttgarter Beitr. Naturk., Ser. C., No. 28, pp. 1–100.

Šilhavý, V. 1979. New American representatives of the subfamily Samoinae (Opiliones, Phalangodidae, Arach.). Annot. Zool. Bot., Bratislava, no. 130, 27 pp.

Sørensen, W. 1932. Descriptiones Laniatorum (Arachnidorum Opilionum subordinis). Opus posthumum recognovit et edidit Kai L. Henriksen. K. dansk. Vidensk. Selsk. Skr. (Sec. Sci., 9 sér.), 3: 197–442.

Staręga, W. 1989. Harvestmen (Opiliones) from the Mascarene Islands and resurrection of the family Zalmoxidae. Ann. Natal Mus., 30:1–8.

Staręga, W. 1992. An annotated check-list of Afrotropical harvestmen, excluding the Phalangiidae (Opiliones). Ann. Natal Mus., 33:271–336.

Manuscript received 14 February 1997, revised 20 June 1997.